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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,847	01/02/2004	Jesus Martinez	134/133	9447

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EXAMINER

FORTUNA, ANA M

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 05/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/749,847		MARTINEZ ET AL.	
	Examiner		Art Unit	
	Ana M. Fortuna		1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/2/04</u> . | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thibos (US 4,824,566).

Thibos teaches the device including hollow fiber membranes wound around a permeable core, at an angle with respect to the axial length of the core (Fig. 1, elements 1, 2, 5, 6, column 4, lines 24-55, and column 12, lines 40-54, column 13, lines 3-13).

The device including a housing, bore fluid entrance and outlet, a baffle within the core, an outlet for the permeate or filtered fluid, defining the fluid path as claimed in claim 1, are also disclosed (see elements 13, 16, 23, 24, 21, Fig. 2, and column 9, lines 49-68, and column 10, lines 1-12). The core is disclosed by Thibos, as porous, e.g. to permit the passage of the raffinate (permeate), and can be made from metals, thermoset plastic materials, etc (see column 10, second paragraph, column 13, last paragraph, column 14, lines 1-13). Providing the core with multiple layers with angles ranging between 45 to 60 degree, which includes the 30 to 60 degree range claimed is disclosed, as discussed above. Thibos fails to teach the size of the ports (openings) in the core as claimed in claim 1, e.g. between 50 to 200 microns. It would have been obvious to one skilled in the art at the time the invention was made to adjust the porosity or openings of the core to allow passage of the permeate without increasing pressure in

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the permeate side. One skilled in the art would have been motivated to provide a core with larger pores or holes in modules having larger packing, e.g. to avoid restricting the permeate passage, and avoid back pressure generation.

As to claim 2, metal beads are not disclosed, however, metal core are disclosed. It would have been obvious to one skilled in this art to mark the core from metal material, and further start with beads or powder as raw material for the porous core, the raw material is not critical for the production of the porous product or core.

Regarding to claim 5, Thibos teaches the dependency on the core L/D relationship; when that ration increases the minimum angle can be selected to produce a stable filament path, with satisfactory range being from 25-50 degrees; selecting a higher angle fro a first layer or stratum, and lower angles for the successive layers is also suggested (see column 12, lines 40-column 13, lines 1-8). It would have been obvious to one skilled in this art at the time this invention was made to select an angle of 35 degrees for the first layer of wound hollow fibers on the core, or layer, and further select e.g. 30 degrees, based on the particular LD ration of the core, and the suggested reduction of winding angles in the successive layers, as discussed in Thibos.

3. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thibos (US 4, 824,566) as applied to claims 1-2 and 5 above, and further in view of Haworth et al (US 5,462,619). Thibos fails to teach the membrane material as claimed din claim 3 of the present invention, a cellulose membrane as semipermeable membrane is disclosed instead. Haworth et al teach helically or spirally wounding fiber of microporous polypropylene on a core at an angle with respect to the core, the hollow

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fiber membranes are formed as a ribbon of membranes spaced and passing through a guide to form layers of membrane on the core (Fig. 4, column 3, lines 33-65, column 4, lines 10-60, and column 8, lines 18-23, and 46-60). It Would have been obvious to one skilled in this art to use the teaching of Thibos for forming a polypropylene membrane module, or alternatively change the membrane material in Thibos to produce a gas separation membrane e.g. for a hydrophobic polypropylene, as suggested by Haworth et al. The change in membrane performance by changing to the membrane in the module of Thibos, e.g. to a propylene membrane, would have been expected by the skilled artisan. Haworth et al teaches a wind angle of 23 degrees, however, Thibos teaches the angle dependency of the core L/D relationship. Therefore modification in the angle, based on the selected core diameter would have been obvious to one skilled in this art at the time the invention was made based on Thibos 's teaching.

Regarding claim 4, the effect in fiber spacing in membrane packing density is also disclosed in Haworth et al. The specific spacing is not disclosed in terms of an absolute distance or range, however, using a fiber guide adapted to control spacing between the fibers as desired to obtain a predetermined packing density is suggested (see column 4, 52-60, column 9, lines 18-41). Based on Haworth et al.'s teaching, it would have been obvious to one skilled in the art at the time this invention was made, to space the fibers in the ribbon or band of membranes at a desire spacing depending on selected packing density of the final module; controlling the spacing in each of the layers to provide a desire module shape or packing layer would have been also obvious to the skilled in the art. Although the distance between the fibers is not disclosed in Thibos, He suggests

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packing uniformity to avoid polarization and scaling and to facilitate flushing and reverse flow, which suggests a minimum spacing between the fibers. Adjusting the distances between the fibers to achieve uniform packing is disclosed in Thibos, selecting fiber properties, the spacing in each layer to maintain uniformity appears to be within the knowledge of the skilled artisan, and will required a minimum experimentation, based on the combine teaching of Thibos and Haworth et al.

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference 5,538,642 teaches conventional membrane cores made form porous material and sintered polymers. RE. 29,447 also teach core materials. Additionally cited reference disclosed modules including hollow fibers helically wound around a core. US 4,021,351 teaches making the holes in the core such that an adequate flow can be obtained.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana M. Fortuna whose telephone number is (571) 272-1141. The examiner can normally be reached on 9:30-6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (571) 272-1151. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Ana M Fortuna', is positioned above the printed name.

Ana M Fortuna
Primary Examiner
Art Unit 1723

AF
May 03, 2006